Index

Symbols

! (exclamation point)
  - in link formula syntax, 638
  - when referencing cells in other workbooks, 224
  - when referencing cells in other worksheets, 223

" (quote), in workbook filenames, 161

# (hash) marks
  - cells filled with, 50, 68, 425
  - in formula errors, 229

& (ampersand), entering in text, 189

& (concatenation) operator, 189, 208, 210, 225, 255

' (comment indicator), 936

() (parentheses)
  - nesting within formulas, 210–211
  - overriding Excel's built-in precedence, 210–211

- (negation) operator, 430, 431

- (subtraction) operator, 208, 210, 431

>= (greater than or equal to) operator, 208

> (greater than) operator
  - in condition arguments, 296
  - as formula operator, 208, 210
  - in workbook names, 161

<= (less than or equal to), 208, 209

< (less than) symbol
  - as formula operator, 208, 210
  - in workbook names, 161

* (asterisk)
  - in condition arguments, 306
  - searching for, 81
  - in workbook names, 161
  - in worksheet names, 57

+ (addition) operator, 207, 208, 210

+ (plus sign), in worksheet outlines, 634

, (comma)
  - in automatic number formatting, 46
  - in function arguments, 213
  - as list separator, 214
  - as one-dimensional horizontal array list separator, 404
  - as one-dimensional vertical array list separator, 405

as range reference operator, 214, 235

as two-dimensional horizontal array list separator, 405

- (minus sign), 634

/ (division) operator, 208, 209

/ (slash)
  - in workbook names, 161
  - in worksheet names, 56

: (colon)
  - in range addresses, 29, 71
  - as range reference operator, 235
  - in workbook names, 161
  - in worksheet names, 56

; (semicolon)
  - in custom number formats, 50
  - as list separator, 214, 404
  - in number formatting strings, 541, 542
  - as two-dimensional vertical array list separator, 405
  - when suppressing zeros, 543

= (equal sign)
  - as formula operator, 208, 209, 210, 214, 216
  - in condition arguments, 296
  - in named arrays, 407
  - precedence, 210

? (question mark)
  - in condition arguments, 306
  - searching for, 81
  - in workbook names, 161
  - in worksheet names, 57

[] (square brackets)
  - in column names, 226, 229
  - in link formula syntax, 638
  - when applying custom format colors, 554
  - in workbook names, 224
  - in worksheet names, 56

\ (backslash), in worksheet names, 56

^ (exponentiation) operator, 208, 209, 310

{} (curly brackets)
  - in array constants, 403, 407
  - in array formulas, 408, 409
  - in formula names, 401
  - in named arrays, 407
Add Constraint dialog box, 739–740
Add Elements button
   Data Labels, 514
   Error Bars, 516
   Trendline, 517
Add Scenario dialog box, 726–728
Add to Quick Access Toolbar, 197
Add-In Manager, 1028
add-ins, 1027
   adding descriptive language, 1033
   Analysis ToolPak. See Analysis ToolPak
   closing, 1028
   creating, 1030–1031
   creating UI for add-in macros, 1034
   installing, 1030–1031
   opening, 1028
   protecting project, 1034–1035
   reasons for creating, 1029–1030
   saving workbooks as, 1030, 1035
   Solver. See Solver
testing workbooks, 1032–1033
UserForm example, 1031–1035
uses, 1027
Add-Ins dialog box, 1028–1029, 1033
Add-Ins tab, 11
addition (+) operator, 207, 208, 210
AfterSave workbook event, 1000
age, calculating, 276–277
aggregating data
   back-end databases and, 911
   calculated measures, 829–833
   conditional calculations, 303–313
   using DAX-driven calculated columns, 824–827
   increased number of formulas and, 572
   with Power Query, 884–886
alert messages, preventing, 1023
aligning cell contents, 122–127
Alignment tab, Format Cells dialog box, 123–127
All merging conditional formats option, Paste Special dialog box, 91
All using Source Theme option, Paste Special dialog box, 91
Allow Edit Ranges command, 773–774
Allow User to Edit Ranges dialog box, 773–774
Alt key, 20
analysis of variance tool, Analysis ToolPak, 757–758
Analysis ToolPak
   analysis of variance tool, 757–758
correlation tool, 758–759
covariance tool, 759
| (vertical bar)
   as insertion point, 36
   in workbook names, 161
A
About Excel command, 911
ABS function, 242
absolute references, 221–223
   naming formulas, 234
   .accdb file extension, 581
accelerator keys, 20
Accelerator property
   CheckBox control, 991
   OptionButton control, 993
Access files, 581
Accounting number format, 50
Accounting Number Format button, 46, 538
Activate workbook event, 1000
Activate worksheet event, 1003
activating
   charts, 448
   worksheets, 54–55
   Power Pivot Ribbon interface, 785–786
active cells, 7–8
ActiveX controls
   adding to worksheets, 986
   CheckBox, 991
code module for, accessing, 989
   ComboBox, 991–992
   CommandButton, 992
   Design mode, 986, 987
   vs. Forms controls, 984
   Image, 992
   Label, 992
   linking to cells, 989
   ListBox, 993
   macros for, creating, 989–990
   OptionButton, 993
   properties
      adjusting, 987–988
      shared, 988–989
   ScrollBar, 994
   SpinButton, 995
   TextBox, 995–996
   ToggleButton, 996
Add a Digital Signature command, 780
Add Chart Element control, 461
Add Constraint dialog box, 739–740
Add-Ins dialog box, 1028–1029, 1033
Add-Ins tab, 11
addition (+) operator, 207, 208, 210
AfterSave workbook event, 1000
age, calculating, 276–277
aggregating data
   back-end databases and, 911
   calculated measures, 829–833
   conditional calculations, 303–313
   using DAX-driven calculated columns, 824–827
   increased number of formulas and, 572
   with Power Query, 884–886
alert messages, preventing, 1023
aligning cell contents, 122–127
Alignment tab, Format Cells dialog box, 123–127
All merging conditional formats option, Paste Special dialog box, 91
All using Source Theme option, Paste Special dialog box, 91
Allow Edit Ranges command, 773–774
Allow User to Edit Ranges dialog box, 773–774
Alt key, 20
analysis of variance tool, Analysis ToolPak, 757–758
Analysis ToolPak
   analysis of variance tool, 757–758
correlation tool, 758–759
covariance tool, 759
INDEX

descriptive statistics tool, 759
exponential smoothing tool, 759–760
F-test tool, 760, 761
Fourier analysis tool, 760
histogram tool, 761
installing, 756
moving average tool, 761–763
overview, 755–756
random number generation tool, 763–765
rank and percentile tool, 765
regression tool, 765–766
sampling tool, 766
T-test tool, 766–767
Z-test tool, 767
AND function, 299–303
appending Power Query data, 891–895
application events, 997, 1006–1009
OnKey, 1006, 1008–1009
OnTime, 1006, 1007–1008
Application object, 937
properties, 939
area charts, 476–478
arguments, 213
AND function, 300–301
AVERAGE function, 367
AVERAGEIF function, 312–313
AVERAGEIFS function, 313
CalcTax function, 952
CHOOSE function, 287
CONVERT function, 252
COUNT function, 251
COUNTA function, 251
COUNTBLANK function, 251
COUNTIF function, 622
creating functions
  with no arguments, 953–954
  with one argument, 954–955
  with a range argument, 956–957
  with two arguments, 956
  as wrapper for built-in VBA functions, 957–958
DATE function, 283–284, 285
DATEDIF function, 276
DOLLAR function, 268–269
EFFECT function, 345
EOMONTH function, 286
FIND function, 260–261
FREQUENCY function, 383–384
HLOOKUP function, 320
IF, 296
IF function, 246
IFERROR function, 322
INDEX function, 319
INDIRECT function, 298–300, 327–328
IRR function, 359
LARGE function, 373–374
LEFT function, 257, 259, 868
MATCH function, 319–320, 324, 325
MAX function, 372
MID function, 259, 868
MIN function, 372
NETWORKDAYS function, 278
NETWORKDAYS.INTL function, 278
NOMINAL function, 345
NumSign function, 948
OFFSET function, 369
PMT function, 345–346
PV function, 355
QUARTILE function, 378–379
RANK function, 374–375
RIGHT function, 257, 259, 868
ROUND function, 247, 249–250
SERIES function, 513
SLN function, 352
SMALL function, 373–374
SUBSTITUTE function, 262
SUBTOTAL function, 226
SUM function, 403
SUMIF function, 303–304, 303–306
SUMIFS function, 306
SUMPRODUCT function, 365–366, 403
syntax errors, 424
text function, 267
textJOIN function, 255, 600
time function, 294
VDB function, 353
VLOOKUP function, 317–318
WORKDAY.INTL function, 280
XIRR function, 359
arithmetic mean, 311
Arrange Windows dialog box, 52–53
array constants
  creating, 403–404, 411–412
  naming, 407–408
array formulas
  downside of, 410
  editing, 409–410
  entering, 408
  multicell, 400–401
array formulas (continued)
  advantages/disadvantages, 401
  contracting, 410
  creating, 400–401
  creating array constants from values in a range, 411–412
  creating arrays from values in a range, 411
  creating arrays of consecutive integers, 415–416
  expanding, 410
  transposing arrays, 414–415
  using functions with arrays, 413
overview, 399–400
selecting range, 408–409
single-cell, 401–402
  counting characters in a range, 416–417
  counting text cells in a range, 418–419
  eliminating intermediate formulas, 419–421
  replacing range references with array constants, 421–422
  summing three smallest values in a range, 417–418
arrays
  creating
    from values in a range, 411
    of consecutive integers, 415–416
  one-dimensional horizontal arrays, 404–405
  one-dimensional vertical arrays, 405
  performing mathematical operations on, 412–413
selecting, 78
transposing, 414
two-dimensional arrays, 405–406
using functions with, 413, 416
Artistic Effects command, 564
auditing tools
  Excel's background error-checking feature, 435–436
  finding cells by type, 432–433
  Formula Evaluator, 436–437
  tracing cell relationships, 433–435
  tracing error values, 435
  viewing formulas, 433
Auto Outline, 627, 632
auto-updating Sparklines, 535
AutoComplete, 40–41
AutoCorrect, 41–42, 441–442
  and syntax errors, 425
AutoFill, 39–40
  copying to adjacent cells, 86
AutoFit Column Width, 68
AutoFit Row Height, 69
AutoRecover, 159
  adjusting, 28
  configuring, 160
  recovering unsaved work, 160
  recovering versions of current workbook, 159–160
AutoSize property, 988
Image control, 992
TextBox control, 995
AVERAGE function
  arguments, 367
  calculating averages, 375–377
  calculating employee turnover, 342–343
AVERAGEIFS function, 312–313
averages. See also means
  calculating, 375–377
  moving, 367–371
  weighted, 365–367
axes
  category axes, 451
    for 3-D column charts, 469
    for bubble charts, 477
    for line charts, 469
    modifying, 506–509
    for radar charts, 476
    for surface charts, 477
    titles, 497–498
    for XY charts, 474
  labels, positioning, 505
  value axes, 451
    in bubble charts, 477
    in combination charts, 518
    defined, 453
    in stock charts, 477
    modifying, 501–505
Azure databases, connecting to Power Query, 855
B
background color, of sheet tabs, changing, 57
background images
  displaying, 564
  printing, 185–186
Backstage view, 11
backups, 164–165
  AutoRecover, adjusting, 28
banded rows, 102, 103, 114
bar charts, 471
BASE function, 597
BeforeClose workbook event, 1000, 1002–1003
BeforeDoubleClick worksheet event, 1003
BeforePrint workbook event, 1000
BeforeRightClick worksheet event, 1003, 1006
BeforeSave workbook event, 1000, 1002
Bin ranges, histograms and, 761
BIN2DEC function, 597
binary values, converting to decimal, 597
bitmap images, 563
blank cells, selecting, 78
blank fields, filling in, 862
Blank Workbook command, 22, 153, 154
Blanks option, Go To Special dialog box, 78
bold, applying, 122
Boolean data type, 1024
Border tab, Format Cells dialog box, 128–130
borders
adding, 128–130
simulating gridlines with, 185
bottom text alignment, 125
BoundColumn property
ComboBox control, 992
ListBox control, 993
box & whisker charts, 484–485
break-even calculations, 338–340
bubble charts, 479, 480
bucketing data into percentiles, 377–379
business calculations. See also financial calculations
break-even, 338–340
CLV (customer lifetime value), 341–342
cost of goods sold, 336
customer churn, 340–341
EBIT (earnings before interest and taxes), 335–336
EBITA (earnings before interest, taxes, depreciation, and amortization), 335–336
employee turnover, 342–343
gross profit margin, 333–335
gross profit margin percent, 333–335
ROA (return on assets), 337–338
business intelligence. See Power Pivot buttons
chart customization buttons, 494
simple buttons, 13
spin buttons, 14
split buttons, 13
toggle buttons, 13
Byte data type, 1024

C
calculated columns
creating, 818–819
formatting, 819–820
hiding from end users, 821–822
overview, 817
referencing in other calculations, 820
calculated measures
creating, 830–832
deleting, 832–833
editing, 832
overview, 829–830
calculator, Formula bar as, 237
calendar quarters, calculating, 286
Camera tool, 560
Capitalize Each Word command, 865
cash flow
future value and, 355
internal rate of return, 358–359
nonperiodic future cash flows, 359–360
positive and negative, 357–358
present value and, 346, 355–357
category axis, 450, 451
for 3-D column charts, 469
for bubble charts, 477
defined, 453
for line charts, 469
category_labels argument, SERIES function, 513
CEILING function, 248
cell dependents, 434–435
cell precedents, 433–435
cell references
absolute references, 221–223, 236
to cells outside the worksheet, 223–225
changing types, 223
invalid, 429
mixed references, 221–223
names, applying, 236
overview, 220–223
in PivotTables, 701–703
Cell Styles command, 143–146
cells. See also ranges
active cells, 7–8
adding text, 608–609
aligning contents, 122–127
blank cells, 425–426
comments
alternative to, 100
Index

cells. See also ranges (continued)
   changing shape, 100–101
   deleting, 35, 102
   editing, 101
   formatting, 99–100
   hiding, 101
   inserting, 98–99
   reading, 101
   selecting cells containing, 78
   showing, 101
   copying, 81–82
      to adjacent cells, 86
      containing conditional formatting, 142
      to other worksheets, 87
   paste options, 89–93
   using drag-and-drop, 85–86
   using Office Clipboard, 87–89
   using Ribbon commands, 82
   using shortcut keys, 83
   using shortcut menu commands, 83, 84

data types, 29–31
   defined, 71
   deleting contents, 34–35
   editing
      color-codes, 430
      contents, 35–37
   filled with hash (#) marks, 425
   filling gaps, 606–607
   finding, 432–433
   gridlines, printing, 185
   highlighting
      based on value of another cell, 387–389
      with values lower than hard-coded value, 385–387
   input messages, displaying, 625
   inserting, 66
   merging, 125–126
   named styles, 143–146
   navigating, 179–182
   preventing from printing, 191–192
   removing text, 607–608
   replacing contents, 35
   replacing text, 609–610
   selected cell indicator, 6
   tracing relationships, 433–435
   unique address, 7
   unlocking, 770–772
   center text alignment, 123, 125
   certificate authority, 780
   certificates, obtaining, 780
   Change Chart Type dialog box, 456
   Change worksheet event, 1003–1004
   changing cells, Scenario Manager, 725
      entering in Add Scenario dialog box, 727
      maximum number per scenario, 730
      modifying scenarios, 729
      naming, 726
   CHAR() function, 264–265
   chart area, 450, 451, 495–496
   Chart Elements button, 494
      chart titles, adding, 498
      gridlines, adding/removing, 500
   Chart Elements control, 490, 491–492
   Chart Filters button, 494
   chart sheets
      converting chart on to embedded chart, 460–461
      converting embedded chart to chart sheet, 460–461
      copying charts on, 461
      deleting, 461
      overview, 449
   Chart Styles button, 494
   chart templates, creating, 522
   Chart Tools
      Format
         Insert Shapes, 499–500
         Shape Styles, 495, 501
   Chart Tools Design
      Chart Layouts
         Add Chart Element, 461
         Quick Layout, 454
      Chart Styles, 456
      Data
         Switch Row/Column, 454
      Location
         Move Chart, 460
      Type
         Change Chart Type, 456
   Chart Tools Format, 459
      Shape Styles
         Shape Effects, 459
         Shape Fill, 459
         Shape Outline, 459
      Size, 460
   Charts
      Insert Statistic Chart, 483
   charts
      activating, 448
      adding elements, 457–458, 461
area charts, 476–478
bar charts, 471
box & whisker charts, 484–485
bubble charts, 479, 480
column charts, 469–471
copying, 461
copying formatting, 463
creating
  based on template, 522
  basic steps, 453–454
  combination charts, 518–521
customizing
  adding labels, 513–515
  adding trendlines, 517–518
  category axis, 506–509
  Chart Area, 495–496
  Plot Area, 496–497, 496–497
  selecting elements, 489–492
  using chart customization buttons, 494
  using the Format task pane, 493–494
  using the Mini toolbar, 495
  using the Plot Area, 495–496
  using the Ribbon, 494–495
deleting elements, 457–458, 462
elements of, 450–452
embedded. See embedded charts
formatting, 458–459, 462–463
  applying, 1022
  copying formatting, 500
funnel charts, 487, 488
histogram charts, 481–482
how Excel handles, 446–447
layout, applying, 456
legends, 450, 451, 498–500
limitations, 452
line breaks, adding, 264–265
line charts, 471–473
map charts, 487–489
moving, 460
overview, 445–446
Pareto charts, 483
pie charts, 473–476
PivotCharts, 703–707
preventing from printing, 191–192
print formatting, 466
properties, modifying, 1022
radar charts, 478–479
renaming, 463
resizing, 460
Sparklines. See Sparklines
stock charts, 479, 481
styles, applying, 456–457
sunburst charts, 485–486
surface charts, 479, 480
titles, 497–498
treemap charts, 486–487
types
  modifying, 456, 1021–1022
  overview, 466–467
  selecting, 467–469
waterfall charts, 483–484
XY charts, 476
Check Accessibility command, 780
check box controls, 14
Check Compatibility command, 780
CheckBox ActiveX control, 991
checkerboard shading, creating, 140
CHOOSE function, 287–288
circular reference errors, 230–231, 424, 435
CLEAN function, 265, 597
cleaning data, 587
  adding text to cells, 608–609
  changing case of text, 595–596
  checklist, 609–610
  checklist for, 609–610
  classifying values, 598–599
  converting values, 597–598
  converting vertical data to horizontal data, 603–605
  extracting filenames from URLs, 601
  filling gaps in imported reports, 606–607
  fixing trailing minus signs, 609
  identifying duplicate rows, 589
  joining columns, 599–600
  matching text in lists, 601–602
  randomizing rows, 601
  rearranging columns, 600–601
  removing duplicate rows, 587–589
  removing extra spaces, 596–597
  removing strange characters, 597
  removing text in cells, 607–608
  replacing text in cells, 607–608
  spell-checking, 607
  splitting text, 589–595
  from text fields, 265
cleaning text, 866–868
Clear All command, 142
Clear Formats command, 142
Clear Outline, 9
Index

Clear Rules command, 142
Close button, 21

closing
  add-ins, 1028
  task panes, 21
  UserForms, 972
  windows, 54
  workbooks, 164
    BeforeClose event, 1000, 1002
    using VBA, 1020

CLV (customer lifetime value), calculating, 341–342
Collapse the Ribbon button, 5, 6
collections (of objects), 937–938
color
  color scale conditional formatting, 133–134
  custom format colors, applying, 544–545
  document themes, customizing, 149–151
  formatting worksheets, 127–128
  sheet tab color, changing, 57
cols argument, OFFSET function, 369
column charts, 469–471
Column Differences option, Go To dialog box, 78
Column Width dialog box, 68
Column widths option, Paste Special dialog box, 91
ColumnCount property
  ComboBox control, 992
  ListBox control, 993

columns
  column letters, 5, 6
  concatenating, 863–865
  custom columns
    adding, 877–878
    concatenating, 878–879
    conditional logic, 883–884
    data type conversions, 879–881
    transformation functions, 881–883
  deleting, 67
duplicate
  identifying, 589
  removing, 587–588
headers, printing, 185
hiding, 69
inserting, 66–67
joining, 599–600
labeling overview, 7
orientation, switching, 454–455
pivoting, 875–876
rearranging, 600–601
selecting, 73
splitting, 870–873
titles, printing, 183–185
unhiding, 69
unpivoting, 873–875
width, changing, 67–68
combination charts, creating, 518–521
Combine Queries command, 897
ComboBox ActiveX control, 991–992
Comma Style button, 46, 538
CommandButton ActiveX control, 992

commands
  adding to Quick Access toolbar, 17–18
  not on the Ribbon, 17–18
  Quick Access toolbar, 195–199
  right-clicking to display, 16
  screen tips, 12
  searching for, 15
touch-related, 8

comments
  in cells
    alternative to, 100
    changing shape, 100–101
    deleting, 35, 102
    formatting, 99–100
    hiding, 101
    inserting, 98–99
    reading, 101
    selecting cells containing, 78
    showing, 101
  in macros, 922
  in VBA code, 936
Comments option, Go To dialog box, 78
Comments option, Paste Special dialog box, 91
Compare Side by Side feature, 62
comparing worksheets, 61–62
CONCAT function, 599–600
concatenating columns, 863–865
concatenation (&) operator, 189, 208, 210, 225
conditional analysis, 295
  checking for multiple conditions, 296–297, 299–303
  checking for simple conditions, 295–296
  counting values that meet certain condition, 309–310
  counting values that meet two or more conditions, 310–311
  getting averages of numbers, 311–313
  summing values between date range, 307–309
  summing values that meet certain condition, 303–306

1044
summing values that meet two or more conditions, 306–307
validating conditional data, 298–299
Conditional Formats option, Go To Special dialog box, 79
conditional formatting, 131
applying, 131
color scales, 133–134
copying cells containing, 142
data bars, 131–133
deleting, 142
examples, 138–141
formula-based rules, 137–138
graphical formats, 131–136
highlighting cells
based on value of another cell, 387–389
with values lower than hard-coded value, 385–387
highlighting values
based on dates, 393–398
in one list and another, 391–393
in one list but not another, 389–391
icon sets, 135–136
locating cells containing, 142–143
managing rules, 142
selecting cells containing, 79, 142
Conditional Formatting Rules Manager dialog box, 131, 142
Confidence Level option, Regression dialog box, 766
Consolidate dialog box, 649–650
consolidating worksheets, 646–654
example, 650–653
refreshing consolidation, 653–654
sources, 654
using external reference formulas, 647–648
using the Consolidate dialog box, 649–650
using the Paste Special dialog box, 648–649
Constant Is Zero option, Regression dialog box, 766
constants, named, 235
Constants option, Go To Special dialog box, 78
Constraint Precision option, Solver Options dialog box, 743
contextual tabs, 12
contracting multicell array formulas, 410
tools
Forms controls, 984
UserForm controls
accelerator keys, 980
adding, 968
changing properties of, 969–970
tab order, 980–981
conversion functions, 251–252
CONVERT function
unit conversions, 251–252
value conversions, 597–598
Convert To Columns Wizard, 591–592
copy and paste, 587
cells/ranges, 81–82, 1012–1013
to adjacent cells, 86
from cell to cell, 35
containing conditional formatting, 142
to the Office Clipboard, 87–89
paste options, 89–93
using drag-and-drop, 85–86
using Paste Options buttons, 84–85
using Ribbon commands, 82
using shortcut keys, 83–84
using shortcut menu commands, 83
using the Paste Special dialog box, 90–93
to other worksheets, 87
chart formatting, 463, 500
charts, 463
formulas, 237
page setup settings, 190–191
PivotTables, 440
ranges, 1012–1014
worksheets, 57–58
Correlation dialog box, 757–758
correlation tool, Analysis ToolPak, 758–759
cost of goods sold, calculating, 336
COUNT function, 250–251
COUNTA function, 250–251
COUNTBLANK function, 250–251
COUNTIF function, 309–311, 418, 622
accepting non-duplicate entries, 622
accepting text beginning with specific character, 623
COUNTIFS function, 384
counting
characters in text string, 263–264
values in a range, 250–251
COVAR function, 759
covariance tool, Analysis ToolPak, 759
Create Forecast Worksheet dialog box, 361–363
Create PDF/XPS command, 778
Create PivotTable dialog box, 663
Create Relationships dialog box, 811–812
Create Sparklines dialog box, 525–526
CSV files, 581
exporting data to Power Query, 853–854
exporting to, 610
Index

Cube functions, 833–834
currency
   applying regional currency format to text, 268
   Currency data type, 1025
   Currency number format, 50
Current Array option, Go To Special dialog box, 78
Current Region option, Go To Special dialog box, 78
cursor, in dialog box controls, 20
custom error bars, 517
Custom Views, 192–194
customer churn, calculating, 340–341
customer lifetime value (CLV), calculating, 341–342
Customize Ribbon tab, Excel Options dialog box, 202–203, 202–204
customizing
   charts
      adding labels, 513–515
      adding trendlines, 517–518
      category axis, 506–509
      Chart Area, 495–496
      Plot Area, 496–497
      selecting elements, 489–492
      using chart customization buttons, 494
      using the Format task pane, 493–494
      using the Mini toolbar, 495
      using the Ribbon, 494–495
document themes, 149–150
Quick Access toolbar, 17–18, 195–197
   adding commands, 197–199
   adding Ribbon commands, 17
   rearranging icons, 199
   removing icons, 199
   resetting to default state, 200
   sharing customizations, 200
   for specific workbooks, 199
Ribbon
   adding commands to groups, 203
   creating new groups, 203
   creating new tabs, 202
   reasons for, 201
   restoring to default state, 204
   sharing customizations, 200
   what can be customized, 201

D
   D time unit code, DATEDIF function, 276
   dashboards
      attributes, 567
   audience, establishing, 568
   design best practices, 574
      avoiding fancy formatting, 575
      formatting numbers effectively, 576
      importing only useful data, 574–575
      limiting to one printable page, 575
      using titles and labels effectively, 576
   dimensions, defining, 569
drill-down features, determining need for, 569–570
   filters, defining, 569
   key performance indicators (KPIs), delineating, 568
   modeling best practices, 570
      importing only useful data, 572–573
      organizing data model, 573–574
      separating data, analysis, and presentation, 570–571
      starting with appropriately structured data, 571–572
   purpose, establishing, 568
   refresh schedule, establishing, 570
   required data sources, cataloging, 569
Data
   Analyze
      Data Analysis, 756
      Solver, 738, 739
Data Tools
   Data Validation, 614–615
   Flash Fill, 592–595
   Relationships, 710
   Remove Duplicates, 11–12
   Text to Columns, 591
Forecast
   Forecast Sheet, 361–363
   What-If Analysis, 719, 726
Get Data
   Combine Queries, 897
   Data Source Settings, 857
   From Azure, 855
   From Database, 855
   From File, 852, 854
   From Other Sources, 855, 856
Queries & Connections, 844–846
data analysis
   Analysis ToolPak
      analysis of variance tool, 757–758
      correlation tool, 758–759
      covariance tool, 759
      descriptive statistics tool, 759
      exponential smoothing tool, 759–760
F-test tool, 760, 761
Fourier analysis tool, 760
histogram tool, 761
installing, 756
moving average tool, 761–763
overview, 755–756
random number generation tool, 763–765
rank and percentile tool, 765
regression tool, 765–766
sampling tool, 766
T-test tool, 766–767
Z-test tool, 767
DAX (Data Analysis Expression) functions
building DAX-driven calculated columns, 824–827
identifying for calculated columns, 1424
nesting, 829
referencing fields from other tables, 827–829
Data Analysis dialog box, 756–757
data bars, displaying, 131–133
data body, 103
data entry
AutoComplete, 40–41
AutoCorrect, 41–42
AutoFill, 39–40
data forms, 42–44
dates, 33–34
Enter mode, 33
numbers, 31–32
decimal points, 38–39
formatting, 44–50
fractional values, 42
text, 32–33
times, 34
Data Interchange Format, exporting to, 611
data labels, 451
vs. data tables, 521
data models
dashboard modeling best practices, 570–574
documenting, 573–574
flat files as, 572
for PivotTables, 707–713
PivotTables based on, 707–713
Power Pivot data model
adding tables, 787–788
feeding, 807–813
loading data from flat files, 798–802
managing relationships, 813–814
preparing tables, 786
referencing fields from other tables, 827–829
refreshing, 803–804
removing tables, 814–815
using Cube functions in, 833–834
spreadsheet reports as, 571–572
data points, 450
data series
adding to charts, 510–511
in area charts, 476
in bar charts, 471
in bubble charts, 479
changing data used by, 511–513
in column charts, 469
combination charts, creating, 518–521
data tables, displaying, 521–522
defined, 452
deleting, 510
error bars, adding, 516–517
hiding, 510
identifying, 451
labels, adding, 513–515
limitations, 454
in line charts, 472
missing data, handling, 515–516
moving averages, 761–763
overview, 446–447, 509–510
in pie charts, 467, 473
in radar charts, 478
in stock charts, 479
in surface charts, 479
trendlines, adding, 517–518
Data Source Settings command, 857–858
data sources, for dashboard projects
adding dimensions, 569
cataloging, 569
establishing refresh schedules, 570
Data tab, 10
Data Table dialog box, 719
data tables
adding to charts, 521–522
creating, 718–724
one-input data tables, 718–721
overview, 717–718
two-input data tables, 721–724
data types, 29–31
formulas, 31
numeric values, 29–30
overview, 29
text, 30
VBA data types, 1024–1025
data validation
- cell references, 619–621
criteria, specifying, 614–617
drop-down lists, creating, 617–618
formulas for, 619
  accepting dates by day of week, 623
  accepting larger value than previous cell, 621
  accepting non-duplicate entries only, 622
  accepting text beginning with specific character, 623
  accepting text only, 621
  accepting value not exceeding a total, 623
  creating dependent lists, 623–625
overview, 613–614
without restricting data entry, 625–626
Data Validation dialog box, 614–615
  Error Alert tab, 615, 626
  Input Message tab, 615
  Settings tab, 614, 615–616, 619, 621
Data Validation option, Go To Special dialog box, 79
Databases
- Azure databases, connecting to Power Query, 855
- back-end databases, 911
- file formats, 580–581
- importing database files, 582–583
- relational databases
  - connecting to Power Query, 855
  - loading data into Power Pivot data model, 795–800
Date category axis, 506
Date data type, 1025
DATE function
  - converting dates to Julian format, 283–284
  - returning last day of month, 285
Date number format, 50
date(s)
  - age, calculating, 276–277
  - business days excluding holidays, listing, 278–280
  - calendar quarters, calculating, 286
  - current, returning, 275–276
  - custom number formatting, 545–546
  - entering, 270–271
  - extracting parts of, 280–281
  - fiscal month, returning, 288
  - fiscal quarter, calculating, 287–288
  - formatting, 273
  - highlighting cells based on, 393–398
  - Julian format, converting to, 282–284
  - last day of month, returning, 285–286
last weekday of month, calculating, 290
of Nth weekday, calculating, 289
number of days between, calculating, 277
number of years and months between, calculating, 282
percent of year completed/remaining, calculating, 284
problems with, 273–275
regional settings and, 34
searching for, 271
serial numbers, 269–270
workdays between, calculating, 277–278
date-stamping worksheets, 44
DATEDIF function
  - calculating age, 276–277
  - calculating days between two dates, 277
  - calculating number of years and months between dates, 282
DAX (Data Analysis Expression) functions
  - building DAX-driven calculated columns, 824–827
  - identifying for calculated columns, 1424
  - nesting, 829
  - referencing fields from other tables, 827–829
DAY function, 280, 281
dBase files, 581
Deactivate workbook event, 1000
Deactivate worksheet event, 1003
debugging custom functions, 958
DEC2BIN function, 597
DEC2OCT function, 597
Decimal data type, 1025
decimals
  - converting hours/minutes/seconds to a time, 294
  - converting to other number bases, 597–598
  - entering decimal points automatically, 38–39
  - precision problems, 431–432
Decrease Decimal button, 25, 538
default
  - column width, 68
  - font, 120
  - print settings, 173–174
  - Quick Access toolbar tools, 196
  - row height, 68
  - templates, 168–170
  - worksheet names, 56
Define Name command, 94–95, 233
Defined Names
  - Create from Selection, 95, 235
  - Define Name, 94–95
  - Name Manager, 97
Delete Columns option, Protect Sheet dialog box, 772
Index

Delete key, 34
Delete Rows option, Protect Sheet dialog box, 772
Delete Sheet Columns command, 67
Delete Sheet Rows command, 67
deleting
  calculated measures, 832
  cell contents, 34–35
  chart elements, 457–458
  chart sheets, 461
  columns, 67
  comments from cells, 35
  conditional formatting, 142
  data series, 510
  embedded charts, 461
  hyperlinks from cells, 35
  rows, 67
  worksheets, 55–56
dependent workbooks. See also linking workbooks
defined, 637
intermediary links issue, 646
Save As command issue, 644
dependents, selecting, 78
Dependentsoption, Go To Special dialog box, 78
depreciation, calculating, 351–354
descriptive statistics
calculating mean, median, mode, 375–377
getting largest/smallest value, 372–373
getting Nth largest/smallest value, 373–375
overview, 371
descriptive statistics tool, Analysis ToolPak, 759
Design mode, 986
Developer tab, 10–11
Code
  Macro Security, 919
  Record Macro, 925
  Stop Recording, 925
  Use Relative References, 929
  Visual Basic, 926
Controls
  Insert, 984, 986
displaying on Ribbon, 918–919, 985
DEX2HEXfunction, 597
dialog box launchers, 14
dialog boxes, 416–418
displaying
  using InputBox function, 962–963
  using MsgBox function, 963–966
hot keys, 20
modal, 19
  modeless, 19
navigating, 19–20
tabbed, 20
UserForms. See UserForms
DIF files, 581, 611
digital signatures, adding to workbooks, 780
dimensions, for dashboard projects, 569
direct precedents, 433
distributed text alignment, 124, 125
#DIV/0! errors, 230, 427
divide-by-zero errors, 245–246
division (/) operator, 208, 209
Do loops, 942–943
Document Inspector dialog box, 779–780
document themes, 147–148
  applying, 148–149
  customizing, 149–150
DOLLAR function, 268
double data type, 1025
drag-and-drop
copying cells/ranges, 85–86
moving cells/ranges, 85–86
Draw Border command, 128
Draw Border Grid command, 128
drawing layer, 5
Drawing Tools
  Format
    Arrange, 552, 553
    Insert Shapes, 553
    Shape Styles, 553, 563
    Size, 553
    WordArt Styles, 553, 563
  drill-down features, of dashboards, 569–570
drop-down lists, creating, 617–618
duplicate records, removing, 588, 859–861, 860–861
dynamic labels, creating, 557–558
dynamic models, 715. See also what-if analysis

E
EBIT (earnings before interest and taxes), calculating, 335–336
EBITDA (earnings before interest, taxes, depreciation, and amortization), calculating, 335–336
Edit mode
  changing to Enter mode, 38
  entering, 35–36
Edit Objects option, Protect Sheet dialog box, 772
Edit Points, 556
Index

Edit Scenarios option, Protect Sheet dialog box, 772
Edit Series dialog box, 510, 512
Edit Sparklines dialog box, 535
editing
  array formulas, 409–410
  calculated measures, 832
  cells
    cell contents, 35–37
    color-codes, 430
  formulas, 219–220
PivotTables, 670–671
Power Pivot data connections, 805
  scenarios, 729
  templates, 168
  text, 101
EFFECT function, 343–345
elapsed time, calculating, 291–292
embedded charts, 447–448. See also charts
  converting to a chart sheet, 460–461
  copying, 461
  deleting, 461
  modifying type, 1021–1022
  moving, 460
  printing, 466
  renaming, 463
  resizing, 460
employee turnover, calculating, 342–343
empty strings, filling in, 862–863
Encrypt Document dialog box, 774–775
Encrypt with Password command, 774–775
Enter mode, 33
  changing to Edit mode, 38
EOMONTH function
  returning fiscal months, 288
  returning last day of month, 285–286
Equation Editor, 565
Equation Tools, Design, 565
Error Alert tab, Data Validation dialog box, 615, 626
error bars, adding, 516–517
errors
  formula errors
    AutoCorrect, 441–442
    blank cells not blank, 425–426
    categories, 423–424
    cells filled with hash marks, 425
    circular references, 435
    decimal precision problems, 431–432
    #DIV/0! errors, 230, 427
    extra space characters, 426
    forcing recalculation, 431
    mismatched parentheses, 424–425
    #N/A errors, 230, 428
    #NAME? errors, 230, 428
    #NULL! errors, 230, 428–429
    operator precedence, 430–431
    phantom links, 432
    #REF! errors, 230, 429
    ripple effect, 230
    tracing cell relationships, 433–435
    tracing error values, 427, 435
    #VALUE! errors, 230, 430
printing error values, 427
  returned by lookup functions, hiding, 321–322
ETL (extraction, transformation, loading), 835
Evaluate Formula dialog box, 436–437
events
  application events, 997, 1006–1009
  workbook events, 997, 999–1003
  worksheet events, 997, 1003–1006
Excel
  new chart types, 481–489
  new features in Excel 2019, 4
  uses for, 3
  window overview, 121–123
Excel Options dialog box
  adding icons to Quick Access toolbar, 17–18
  Customize Ribbon tab, 202–203, 202–204
  Quick Access Toolbar tab, 198–200
exponential notation, 332
exponential smoothing, 369–371, 759–760
exponential smoothing tool, Analysis ToolPak, 759–760
exponentiation (**) operator, 208, 209, 310
exporting
  data, 610–611
  UI customizations, 200
extracting
  characters from text string, 258–259
  filenames from URLs, 601
F
  F-test tool, Analysis ToolPak, 760
  fast Fourier transformations, 760
File
  Account
    About Excel, 911
  Export
    Create PDF/XPS Document, 778
Index

Format Cells dialog box (continued)
  Font tab, 121–122
  formatting worksheets, 119–120
  number formatting, 48–50
Format Cells option, Protect Sheet dialog box, 772
Format Columns option, Protect Sheet dialog box, 772
Format Painter button, 130
Format Rows option, Protect Sheet dialog box, 772
Format task pane, 493–494
formatting
  avoiding pasting, 35
  calculated columns, 819–820
  charts, 458–459, 462–463
  copying formatting, 463, 500
  conditional formatting, 131
    applying, 131
    color scales, 133–134
    copying cells containing, 142
    data bars, 131–133
    deleting, 142
    examples, 138–141
    formula-based rules, 137–138
    graphical formats, 131–136
    icon sets, 135–136
    locating cells that contain, 142–143
    managing rules, 142
    selecting cells containing, 142
finding and replacing, 439–440
icons, 552–554
numbers, 44–45
  automatic, 46
  custom number formatting, 50, 540–546
  for dashboards, 576
    Format Cells dialog box, 48–50, 539–540
  hiding zeros, 543–544
  number format strings, 540–546
  numbers in millions, 543
  numbers in thousands, 542–543
  using Ribbon buttons, 46, 537–538
  shortcut keys for, 46, 538–539
  suppressing zeros, 543–544
  in text strings, 266–268
PivotTables, 668–669
shapes, 552–554
worksheet formatting, 117–118
  borders and lines, 128–130
  colors and shading, 127–128
  document themes, 147–151
  fonts, 120–122
with the Format Cells dialog box, 119–120
with the Home tab, 118
with the Mini toolbar, 118–119
named styles, 143–146
text alignment, 122–127
Forms controls, 984
Formula bar, 5, 6
  cell edit mode, entering, 220
  entering formulas manually, 216
  function entry tips, 219
  using as calculator, 237
formula errors
  AutoCorrect, 441–442
  blank cells not blank, 425–426
  categories, 423–424
  cells filled with hash marks, 425
  circular references, 435
  decimal precision problems, 431–432
  #DIV/0! errors, 230, 427
  extra space characters, 426
  forcing recalculation, 431
  mismatched parentheses, 424–425
  #N/A errors, 230, 428
  #NAME? errors, 230, 428
  #NULL! errors, 230, 428–429
  #NUM! errors, 230, 429
  operator precedence, 430–431
  phantom links, 432
  #REF! errors, 230, 429
  ripple effect, 230
  tracing cell relationships, 433–435
  tracing error values, 427, 435
  #VALUE! errors, 230, 430
Formula Evaluator, 436–437
Formulas
  Defined Names
    Create from Selection, 95, 235
    Define Name, 94–95, 233, 407
    Name Manager, 97, 432
Formula Auditing
  Error Checking, 427, 435–436
  Evaluate Formula, 436–437
  Remove Arrows, 427, 434
  Show Formulas, 433
  Trace Dependents, 435
  Trace Precedents, 434
  Watch Window, 65
Function Library
  Date & Time, 275
FREQUENCY function, 383–384
Frontline Systems, 750
full outer joins, 897
full-screen mode, 195
Function Arguments dialog box, 217, 218–219
Function Library, 217
functions
arguments, 213
creation functions, 251–252
creating
with no arguments, 953–954
with one arguments, 954–955
with a range argument, 956–957
with two arguments, 956
as wrapper for built-in functions, 957–958
Cube functions, 833–834
custom functions
calling from procedures, 952
creating, 948
debugging, 958
inserting, 958–960
using in worksheet formulas, 952–953
date and time functions, 275–294
financial functions, 343–363
in formulas, 211–214
inserting into formulas, 217–219
lookup functions, 316–332
text functions, 254–268
VBA functions, 922–923
funnel charts, 487, 488
FV argument, FV function, 355
FV function, 345

G
General number format, 49
Generate GetPivotData command, 703
GETPIVOTDATA function, 702–703
Go to Special dialog box, 77–79, 432–433
Goal Seek, 733, 734–737
goals
calculating percent of, 239–240
Goal Seek, 733, 734–737
graphical conditional formats
color scales, 133–134
data bars, 131–133
icon sets, 134–136
graphics
Artistic Effects, 564
graphics (continued)
  background images, adding, 564
  color scale conditional formatting, 133–134
  data bar conditional formats, 131–133
  Equation Editor and, 565
  equations, inserting as graphics objects, 565
  file formats, 563–564
  icon set conditional formats, 135–136
  linked pictures, creating, 558–560
  screenshots, inserting, 564
  shapes. See shapes
  SmartArt, 561–562
  Sparklines. See Sparklines
  SVG (Scalable Vector Graphics) icons, inserting,
    551–552
  Unicode characters, 546–550
  WordArt, 562–563
Graphics Tools
  Format
    Accessibility, 554
    Arrange, 554
    Change Graphic, 553
    Graphics Styles, 553
    Size, 554
graphs. See charts
gridlines
  adding, 500
  modifying, 501
  printing, 185
  removing, 500
  simulating using borders, 185
  toggling, 129
gross profit margin percent, calculating, 333–335
gross profit margin, calculating, 333–335
Group By command, Power Query, 885–886, 888
Group mode, 75–76, 77
grouping PivotTable items
  automatically, 683–689
  by date, 683–687
  manually, 681–682
  by time, 688–689
GroupName property, OptionButton control, 993

H
hard-coding values in formulas, 236–237
header row, 103
headers
  column headers, printing, 185
  row headers, 103
  printing, 185
toggling drop-down buttons, 114
height argument, OFFSET function, 369
Help system, VBA, 1011
Help tab, 11
HEX2DEC function, 597
hexadecimal values, converting to decimal, 597
Hidden and Empty Cell Settings dialog box, 515, 516
hiding
  calculated columns, 821–822
  columns, 69
data series, 510
  Mini toolbar, 119
  Ribbon, 52
  rows, 69
  shape objects, 552
  status bar, 52
  worksheets, 58
  zeros, 543–544
Highlight Cell Rules, 137
histogram charts, 481–482
histogram tool, Analysis ToolPak, 761
HLOOKUP function
  defined, 316
  looking up values horizontally, 320
  looking up values using closest match, 323–325
  #N/A errors, 196
Home tab, 10
  Alignment
    Merge & Center, 126
    Orientation, 127
    Wrap Text, 33
  Cells
    Insert, 105
  Conditional Formatting
    Manage Rules, 387
    New Rule, 388, 390, 391, 393, 395, 397
Editing
  Clear, 35, 142
  Fill, 86
  Find & Select, 72, 77, 79
  Sort & Filter, 108, 110
Font, 121
  Borders, 128
  Fill Color, 127–128
  Font Color, 127–128
  Font Size, 121
formatting tools, 118
Index

Number, 46, 48
Styles
  Cell Styles, 143–146
  Conditional Formatting, 131–142
horizontal alignment options, 123–124
horizontal axis, 450, 451
horizontal scrollbar, 5, 6
hot keys, 20
  HOUR function, 290–291
hour(s)
  adding to a time, 294
decimal hours, converting, 293
returning, 290–291
  rounding time values, 292–293
HTML files, 582, 611
hyperlinks, deleting from cells, 35
icons
  assigning icon sets, 135–136
  formatting, 552–554
Quick Access toolbar, 196–197
  attaching macros to, 199
  rearranging, 199
  removing, 200
SVG (Scalable Vector Graphics) icons, inserting, 551–552
IF function
  avoiding divide-by-zero errors, 246
calculating elapsed time, 291–292
  checking multiple conditions, 296–297, 299–303
  checking simple conditions, 295–296
  counting text cells in a range, 417–418
If-Then construct, 941–942
IFERROR function
  checking for any error condition, 427
defined, 316
Ignore Integer Constraints option, Solver Options dialog box, 743
Image ActiveX control, 992
importing
  data, 579
database files, 580–581
  filling gaps, 606–607
HTML files, 582
vs. opening files, 582–583
splitting text, 589–595
spreadsheet files, 580
text files, 581, 583–587
XML files, 582
UI customizations, 200
incorrect reference errors, 423
Increase Decimal button, 538
INDEX function
  accessing individual elements from arrays, 408
defined, 316
  looking up exact values, 318–320
  looking up largest/smallest value, 372–373
  looking up last value in column, 331–332
  looking up value using closest match, 324–325
  looking up values based on two-way matrix, 328–330
INDIRECT function
  generating array of consecutive integers, 416
  validating conditional data, 298–299
indirect precedents, 433
infographic widgets, creating, 556–557
inner joins, 897
Input Message tab, Data Validation dialog box, 615
input messages, displaying, 625
Input ranges, histograms and, 761
Input X Range option, Regression dialog box, 766
Input Y Range option, Regression dialog box, 766
InputBox function, 962–963, 1016–1017
Insert
  Charts
    PivotChart, 703
    Recommended Charts, 467
Filters
  Slicer, 699
  Timeline, 700
Icons, 551
Illustrations
  Online Pictures, 563
  Pictures, 563
  Screenshot, 564
  SmartArt, 561
Module, 970
Shapes, 550
Symbols
  Equation, 565
Tables
  Recommended PivotTables, 662–663
  Table, 104
Text
  Signature Line, 780
  Text Box, 253
  WordArt, 563
UserForm, 967

1055
Index

Insert Cells command, 66
Insert Columns command, 66
Insert Columns option, Protect Sheet dialog box, 772
Insert dialog box, 66–67
Insert Function command, 217, 949
Insert Function dialog box, 217–219, 949
Insert Hyperlinks option, Protect Sheet dialog box, 772
Insert Plays option, Protect Sheet dialog box, 772
Insert Sheet Columns command, 6
Insert Sheet Rows command, 6
Insert Slicer command, 110–111
Insert Slicers dialog box, 699
Insert Statistic Chart command, 483
Insert tab, 10
insertion points, when editing cells, 36–37
Inspect Document command, 779
inspecting workbooks, 779–780
installing
add-ins, 1030–1031
Analysis ToolPak, 756
Solver, 738
Integer data type, 1024
IntegralHeight property
ListBox control, 993
TextBox control, 996
interest rates, converting, 343–345
intermediate formulas, eliminating, 419–421
internal data model
feeding, 807–813
managing relationships, 813–814
removing tables, 814–815
internal rate of return, calculating, 358–360
interquartile ranges, identifying statistical outliers, 379–382
intersection operator, 234–236
invisible digital signatures, 780
IRR function, 358–360
ISERR function, 322
ISERROR function, 322
ISNA function, 322
ISSOD function, 619–620
ISTEXT function, 621
italic, applying, 122
Iterations option, Solver Options dialog box, 743
Julian date format, converting to, 282–284
justified text, 124, 125
K
key performance indicators (KPIs), for dashboard projects, 568
keyboard
accessing the Ribbon, 14–15
navigating dialog boxes, 19–20
navigating worksheets, 8–9
number formatting, 46–47
selecting chart elements, 490–491
using within task panes, 21
L
Label ActiveX control, 992
labels
adding to data series, 513–515
axes labels, positioning, 505
category labels, orienting, 507–508
dynamic labels, creating, 557–558
for dashboards, 576
landscape mode, printing in, 181
LARGE function, 373–374
LargeChange property, ScrollBar control, 994
Last Cell option, Go To Special dialog box, 79
leap year bug, 274
left anti joins, 897
LEFT function, 623
converting text to sentence case, 256–257
extracting parts of text string, 258–259, 868
padding numbers with zeros, 266
splitting text, 590
left outer joins, 896
left text alignment, 123
legends, 450, 451
adding to charts, 461, 498
changing font, 1022
chart legends, 498–500
moving, 498–499
selecting individual elements within, 491, 499
using shapes in lieu of, 499–500
LEN function
counting characters in a range, 416
counting specific characters in a cell, 263–264
leveraged interquartile range, 380–382
line breaks, adding to charts, 264–265
line charts, 471–473
linear equations, solving with Solver, 745–746
lines, adding, 128–130
linked pictures, creating, 558–560
LinkedCell property, 988, 989
   CheckBox control, 991
   ComboBox control, 991, 992
   ListBox control, 993
   OptionButton control, 993
   ScrollBar control, 994
   SpinButton control, 995
linking tables to Power Pivot, 785–792
linking workbooks, 637–646
   changing link source, 643
   changing startup prompt, 642–643
   creating external reference formulas, 638–640
   creating links to unsaved workbooks, 640–641
   intermediary links issue, 646
   modifying source workbook, 644–645
   moving source workbook, 644
   opening workbook with links, 641–642
   overview, 637–638
   phantom links, 432
   renaming source workbook, 644
   Save As command issue, 644
   severing links, 643
   updating links, 643
ListBox ActiveX control, 993
ListBoxFillRange property, 988
   ComboBox control, 991, 992
   ListBox control, 993
ListBoxRows property, ComboBox control, 992
ListBoxStyle property
   ComboBox control, 992
   ListBox control, 993
loan payment calculator, creating, 345–348
Locked attribute, 770–772
logical arguments, 299–300
logical errors, 423
logical operators, 208
Long data type, 1024
lookup formulas
   for exact value based on any lookup column, 318–320
   for exact value based on left lookup column, 316–318
   hiding errors, 321–322
   for last value in a column, 331–332
   for values based on multiple criteria, 330–331
   for values based on two-way matrix, 328–331
   for values by closest match, 322–325
   for values from multiple tables, 325–328
   for values horizontally, 320
LOOKUP function
   defined, 316
   #N/A errors, 196
   returning last value, 332
lookup tables, classifying values, 598–599
LOWER function
   converting text to lowercase, 256, 595
   converting text to sentence case, 256–257
   lowercase, converting text to, 256, 595
M
M language, 842–844
m time unit code, DATEDIF function, 276
macro recorder indicator, 5, 6
macros
   adding to Quick Access toolbar, 199, 935, 979–980
   assigning to buttons, 934–935, 979
   assigning to shortcut keys, 933–934
   creating
      by recording macros, 924–935
      by writing VBA code, 935–945
      for ActiveX controls, 989–990
   Developer tab, displaying, 918–919
   Function procedures, 922–923
   listing, 199
   overview, 917
   saving workbooks containing, 920–921
   security of, 919–920
   speeding, 1023–1026
   storing in Personal Macro Workbook, 933
   Sub procedures, 921–922
   uses, 918
major tick marks, 505
Manage Relationships dialog box, 813–814
Manage Rules command, 142
manual what-if analysis, 717
map charts, 487–489
margin, calculating
   break-evens, 338–340
   customer lifetime value (CLV), 341–342
   gross profit margin, 333–335
   gross profit margin percent, 333–335
   vs. markup, 334
margins
   adjusting, 181–183
   aligning headers/footers, 190
default settings, 174
Index

margins (*continued*)
  when using multiline headers/footers, 189
  whitespace, hiding, 176
Mark as Final command, 778
marking workbooks as final, 778
markup, calculating, 334–335
MATCH function
  defined, 316
  looking up exact value based on any lookup column, 318–320
  looking up value using closest match, 324–325
  lookup up values based on two-way matrix, 328–330
  #N/A errors, 196
matching text in a list, 601–602
Max Feasible Solutions option, Solver Options dialog box, 744
Max property
  ScrollBar control, 994
  SpinButton control, 995
Max Subproblems option, Solver Options dialog box, 743
Max Time option, Solver Options dialog box, 743
maximizing windows, 52
MaxLength property, TextBox control, 996
.mouse file extension, 581
.md time unit code, DATEDIF function, 276
MEAN function, 375–377
means
  analysis of variance tests, 3–4
  calculating, 375–377
  covariance, 759
  F-tests, 760
  T-tests, 766–767
  two-sample tests for, 766, 767
  Z-tests, 767
median, calculating, 375–377
Merge & Center control, 13, 126
Merge Across option, Merge & Center control, 126
Merge Cells option, Merge & Center control, 126
Merge Columns command, 863–865
merging
  cells, 125–126
  Power Query queries, 896–901
  scenarios, 729–730
metadata, assigning to workbooks, 162
methods (of objects), 939–940
Microsoft Office Signature Line command, 780
MID function
  extracting parts of text string, 258–259, 868
  splitting text, 590
Min property
  ScrollBar control, 993
  SpinButton control, 995
Mini toolbar, 17
  customizing chart elements, 494–495
  formatting controls, 118–119
  hiding, 119
  minimizing windows, 52
  minor tick marks, 505
MINUTE function, 290–291
minute(s)
  adding to a time, 294
  decimal minutes, converting, 293
  returning, 290–291
  rounding time values, 292–293
mismatched parentheses, 424–425
mixed references, 221–223
MOD function
  alternate-row shading, displaying, 140
  checkerboard shading, creating, 140
  shading groups of rows, 141
modal dialog boxes, 19
MODE function, 375–377
modeless dialog boxes, 19
MONTH function, 280, 281
month(s)
  between dates, calculating, 282
  last date of, returning, 285–286
  last weekday of, calculating, 290
  returning, 281
mouse
  changing active cell, 213–214
  scrolling the wheel, 9
  selecting chart elements, 490–491
  zooming worksheets, 10
Move or Copy dialog box, 57–58
moving
  charts, 460
  legends, 498–499
  Plot Area, 496
  Quick Access toolbar, 196
  ranges, 81–82, 1015
  windows, 52
  worksheets, 57–58
moving average tool, Analysis ToolPak, 761–763
moving averages, 367–371, 761–763
MsgBox function, 963–966
multicell array formulas, 400–401
  contracting, 410
creating, 400–401
creating array constants from values in a range, 411–412
creating arrays from values in a range, 411
creating arrays of consecutive integers, 415–416
expanding, 410
transposing arrays, 414–415
using functions with arrays, 413
MultiLine property, TextBox control, 996
multiple selection, 73
multiplication (·) operator, 207, 208, 209, 211
Multiply option, Paste Special dialog box, 92–93
MultiSelect property, ListBox control, 993

N

#N/A errors, 230, 428
Name box, 94
name box, Excel window, 5, 6
Name Manager, 97–98
#NAME? errors, 230, 428
named styles, 143
applying, 143–144
controlling with templates, 146
creating, 145–146
merging from other workbooks, 146
modifying, 144–145
overview, 143
named views, creating, 193–194
names
array constants, 407–408
constants, 233
formulas, 233–234
range names
deleting, problems with, 428
pasting into formulas, 216
sheet tabs, 56
worksheets, 56–57
negative values, fixing trailing minus signs, 609
net present value, calculating, 356–358
NETWORKDAYS function, 277–278
NETWORKDAYS.INTL function, 278
New Formatting Rule dialog box, 132–133
creating formula-based rules, 137
customizing colors, 133
customizing icon sets, 135
highlighting values based on dates, 393–398
highlighting values based on value of another cell, 367–369
highlighting values in one list and another, 391–393
highlighting values in one list but not another, 389–391
highlighting values with lower values than hard-coded value, 366–367
New Name dialog box, 94–95
New Sheet button, 5, 6
New Sheet control, adding worksheets to workbooks, 55
New Table Style command, 114
NewSheet workbook event, 1000, 1002
NOMINAL function, 343–345
nonleveraged interquartile ranges, 381
Normal Probability option, Regression dialog box, 766
Normal view, printing in, 174, 175
NOW function, 275–276
nper argument
PMT function, 346
PV function, 355
NPV function, 356–358
#NULL! errors, 230, 428–429
#NUM! errors, 230, 429
Num Lock key, 8–9
number bases, converting between, 597–598
Number number format, 50
numbers
formatting, 537
automatic, 46
custom number formatting, 50, 540–546
for dashboards, 576
Format Cells dialog box, 48–50, 539–540
hiding zeros, 543–544
number format strings, 540–546
numbers in millions, 543
numbers in thousands, 542–543
overview, 44–45
using Ribbon buttons, 46, 537–538
shortcut keys for, 46, 538–539
suppressing zeros, 543–544
in text strings, 266–268
identified as text, 254
padding with zeros, 266
quarter numbers, calculating, 286
random number generation tool, 763–765
rounding, 247
to nearest penny, 247–248
to significant digits, 248–250
using formulas, 247
Index

O
Object data type, 1025
objects
  Application, 937
  collections, 937–938
  Excel object model, 937
  methods, 939–940
  properties, 938–939
  qualified object references, 1012
  Range, 940–941
  selecting, 78
  simplifying references, 1024
Objects option, Go To Special dialog box, 78
OCT2DEC function, 597
octal values, converting to decimal, 597
ODBC connections, connecting to Power Query, 855
.odsx file extension, 611
OFFSET function, 316
  calculating dynamic range, 536
  converting vertical data to horizontal, 604–605
OLAP databases, connecting to Power Query, 855
one-click printing, 173
one-dimensional horizontal arrays, 404–405
one-dimensional vertical arrays, 405
OnKey application event, 1006, 1008–1009
OnTime application event, 1006, 1007–1008
Open As Copy command, 170
Open dialog box, 580
Open workbook event, 1000–1001
OpenDocument Spreadsheet, exporting to, 611
opening
  add-ins, 1028
  files
    vs. importing files, 582–583
    unsupported files, 141
workbooks, 154–157
  automatically, 157
  with external reference formulas, 641–642
  Open event, 1000–1001
  requiring password, 774–775
Workbook_Open procedure, 1000–1001
operators
  in formulas, 208–209
  logical, 208–209
  omitting in formulas, 429
  precedence 209–210, 430–431
  reference operators, 234–236
OptionButton ActiveX control, 993
OR function, 302–303
order argument, SERIES function, 513
outliers, statistical, 379–382
outlines
  adding data, 635
  creating automatically, 632
  creating manually, 632–634
  displaying levels, 634–635
  overview, 627–631
  vs. PivotTables, 630–631
  preparing data for, 631–632
  removing, 635

P
padding data, 266
Page Break Preview view, 175, 176–178
page breaks
  inserting, 183
  Normal view, 175, 176
  Page Break Preview view, 175, 176–178
  removing, 183
  when changing page orientation, 181
Page Layout tab, 10
Page Setup
  Background, 185–186, 564
  Breaks, 183
  Margins, 181–183
  Orientation, 181
  Print Area, 180
  Print Titles, 184
  Size, 181
Scale to Fit, 185
Sheet Options
  Gridlines, 185
  Headings, 185
Themes
  Colors, 150–151
  Fonts, 149–150
  Save Current Theme, 151
  Themes, 148–149
Page Layout view, 174, 175–176
Page Setup dialog box
  Margins tab, 182
  Preview box, 182
  print settings, adjusting, 178–180
  Sheet tab, 184
page view buttons, 5, 6
parentheses, mismatched, 424–425
Pareto charts, 483
passwords
  adding to workbooks, 161–162, 774, 775
  when assigning user permissions, 773
  limitations, 769
  removing from workbooks, 775
  for VBA projects, 777
Paste Special command, 90–93, 587, 648–649
.pdf file extension, 611
PDF files
  creating, 194
  saving worksheets as, 778
peekaboo tabs, 554–555
penny, rounding to nearest, 248
Percent Style button, 46, 538
percentage error bars, 516
Percentage number format, 50
percentages
  applying percent increase/decrease to values, 244–245
  calculating, 239
    percent distribution, 243–244
    percent of goal, 239–240
    percent variance, 241
    percent variance with negative values, 242
    running total, 244
  divide-by-zero errors, 245–246
permissions, assigning to worksheets, 773–774
Personal Macro Workbook, 933
PgDn key, 8, 9
PgUp key, 8, 9
phantom link errors, 432
Picture property, 989, 992
Picture Tools
  Format, 564
    Adjust, 564
PictureSizeMode property, Image control, 992
pie charts, 473–476
Pivot Column command, 875–876
PivotChart Tools Analyze
  Actions
    Move Chart, 706
  Show/Hide, 705
PivotCharts
  creating, 703–706
  tips for using, 706–707
  pivoting columns, 875–876
PivotTable Options dialog box, 669
PivotTable Tools
  Analyze
    Show, 669
  Design
    Layout, 669
    PivotTable Styles, 668–669
PivotTable Tools Analyze
  Calculations
    Fields, Items, & Sets, 693, 695
    OLAP Tools, 713
  Data
    Change Data Source, 687
  Filter
    Insert Slicer, 711
    Group
      Group Field, 681
      Group Selection, 681
  Tools
    PivotChart, 703, 705
PivotTable Tools Design
  Layout
    Grand Totals, 696
PivotTables
  adding fields, 671
  converting into Cube functions, 833–834
  copying, 440
  creating automatically, 662–663
  creating based on data model, 707–713
  creating manually
    formatting options, 668–669
    number format, changing, 668
    setting up layout, 664–666
    specifying data, 663–664
    specifying location for, 664
  data appropriate for, 659–662
  examples, 656–658, 672–677
  filtering data, 439
    with slicers, 698–700
    with a timeline, 700–701
  frequency distributions, creating, 689–691
  grouping items
    automatically, 683–689
    by date, 683–687
    manually, 681–682
    by time, 688–689
  modifying, 670–671
  vs. outlines, 630–631
  overview, 655–656
  re-ordering fields, 671
  referencing cells, 701–703
Index

printing
  background images, 185–186
  cell gridlines, 185
  charts, 466
  column headers, 185
  column titles, 183–185
  copying page settings, 190
  custom views, creating, 192–194
  default settings, 173–174
  error values, 427
  named views, creating, 193–194
  Normal view, 174, 175
  number of copies, specifying, 181
  one-click printing, 173
  Page Break Preview view, 175, 176–178
  page breaks. See page breaks
  Page Layout view, 3–4, 174, 175–176
  page margins, adjusting, 181–183
  page orientation, changing, 181
  page settings, adjusting, 178–180
  paper size, specifying, 181
  PDF files, creating, 194
  preventing cells, 191
  preventing objects, 191–192
  previewing, 174
  row headers, 185
  row titles, 183–185
  scaling output, 185
  specifying what to print, 180–181
  watermarks, inserting, 186–187
  worksheets, 26–27
  XPS files, 194
  PRN files, 581
  exporting to, 611
profit
  break-even, 338–340
  EBIT (earnings before interest and taxes), 335–336
  EBITA (earnings before interest, taxes, depreciation, and amortization), 335–336
  ROA (return on assets), calculating, 337
  ROE (return on equity), calculating, 337–338
  Project Properties dialog box, 777–778
  PROPER function, 256, 595–596
properties, ActiveX controls
  adjusting, 987–988
  CheckBox, 991
  ComboBox, 992
  CommandButton, 992
  LinkedCell, 989
  ListBox control, 993
  OptionButton, 993
  ScrollBar, 994
  shared, 988–989
  SpinButton, 995
  TextBox, 995–996
properties (of objects), 938–939
  Application object, 939
  Range object, 940–941
Protect Sheet command, 770–771
Protect Sheet dialog box, 770, 772
Protect Structure and Windows dialog box, 776
Protect Workbook command, 776
  Add a Digital Signature, 780
  Encrypt with Password, 774
  Mark as Final, 778
Protected View, 156
protecting
  VBA Projects, 777–778
  workbooks, 59, 774–777
    adding digital signatures, 780
    inspecting workbooks, 779–780
    marking as final, 778
  worksheets, 59, 769, 770–774
Publish as PDF or XPS dialog box, 194, 778
pv argument, PMV function, 346
Pv function, 354–356
Q
qualified object references, 1012
quarter(s), calculating
  calendar quarter, 286
  fiscal quarter, 287–288
quartiles
  QUARTILE function, 377–379
  QUARTILE.EXC function, 379–382
queries. See Power Query
Queries & Connections
  grouping queries, 904–905
  managing queries, 845–846
  refreshing data, 844
Quick Access toolbar, 5, 6
  customizing, 17–18, 195–197
    adding commands, 17, 197–199
    rearranging icons, 199
    removing icons, 199
    resetting to default state, 200
    sharing customizations, 200
    for specific workbooks, 199
Quick Access toolbar (continued)
default tools, 17, 196
displaying below the Ribbon, 17
full-screen mode, 195
macros, adding, 935, 979
moving, 196
Redo button, 17
tools included, 196
Undo command, 17, 18
Quick Access Toolbar tab, Excel Options dialog box, 198–200
Quick Print, 173

R
radar charts, 478–479
RAND function, 601
Random Number Generation dialog box, 763–765
random number generation tool, Analysis ToolPak, 763–765
Range object, 940–941
ranges. See also cells
copying, 81–82, 1012–1013
to adjacent cells, 86
to the Office Clipboard, 87–89
to other worksheets, 87
paste options, 89–93
using drag-and-drop, 85–86
using Paste Options buttons, 84–85
using Ribbon commands, 82
using shortcut keys, 83–84
using shortcut menu commands, 83
using the Paste Special dialog box, 90–93
using VBA, 1012–1014
counting
characters in, 416–417
selected cells, 1019–1020
text cells in, 418–419
values in, 250–251
defined, 71
determining type of selection, 1018–1019
icon sets, assigning, 135–136
looping through, 1015–1016
moving, 81–82, 1015
named styles, 143–146
names, 93
advantages, 93
creating, 94–97
deleting, problems with, 428
managing, 97–98
pasting into formulas, 216
non-intersecting, 428–429
prompting for cell values, 1016–1017
range intersections, 234–236
reference operators, 234–236
selecting, 72
complete rows and columns, 73
multisheet ranges, 74–77
noncontiguous ranges, 73–74
by searching, 79–81
special types of cells, 77–79
selecting row/column, 1014
selecting to end of row/column, 1014
summing three smallest values, 417–418
rank and percentile tool, Analysis ToolPak, 765
RANK function, 374–375
rate argument
PMT function, 345
PV function, 355
rearranging
columns, 600–601
Ribbon tabs, 203
Recent command, 154, 155
Recommended Charts command, 467
Recommended PivotTables command, 662–663
recording macros, 924–935
absolute vs. relative recording, 929
adding macros to Quick Access toolbar, 935
assigning macros to buttons, 934–935
assigning macros to shortcut keys, 933–934
editing macros, 928–929, 931–932
equation, 926, 929–930
example, 926, 929–930
recording actions, 925
running macros, 930
storing macros in Personal Macro Workbook, 933
testing macros, 928, 932
viewing code, 926–928, 930–931, 933
Redo button, 17
#REF! errors, 230, 429
reference argument, OFFSET function, 369
refresh schedules, of dashboards, 570
refreshing
Power Pivot data, 805–806
Power Query data, 844
worksheets, 653–654
regional settings, 34
Regression dialog box, 765–766
regression tool, Analysis ToolPak, 765–766

1064
relational databases
  connecting to Power Query, 855
  loading data into Power Pivot data model, 793–798
relative references, naming formulas, 221, 234
Remove Duplicates command, 588, 860–861
renaming
  charts, 463
  sheet tabs, 56
Replace Values command, 848, 862, 863, 866
replacing
  cell contents, 35
  formatting, 439–440
  text, 439
    in cells, 607–608
reports
  filling gaps, 606–607
    scenario summary reports, creating, 730–731
Reset to Match Style command, 496
Residuals option, Regression dialog box, 766
resizing
  charts, 460
  Plot Area, 496–497
  tables, 104
  windows, 52
restoring
  Ribbon, 204
  windows, 52
return on assets (ROA), calculating, 337
return on equity (ROE), calculating, 337–338
return_type argument
  WEEKDAY function, 281
  WEEKNUM function, 281
reverse PivotTables, 698
Review tab, 10
  Comments
    Delete, 102
    New Comment, 98
    Next, 101
    Previous, 101
    Show All Comments, 101
    Show/Hide Comment, 101
  Proofing
    Spelling, 440, 607
  Protect
    Allow Edit Ranges, 773–774
    Protect Sheet, 770
    Protect Workbook, 776
    Unprotect Sheet, 770
Ribbon, 5, 6
  accessing with keyboard, 14–15
  chart elements, customizing, 494–495
  commands
    adding to groups, 203
    adding to Quick Access toolbar, 17
    command types, 280–282
  copying cells/ranges, 82
  customizing
    adding commands to groups, 203
    creating new groups, 203
    creating new tabs, 202
    Customize Ribbon tab, Excel Options dialog box, 202–204
    reasons for, 201
    restoring to default state, 204
    sharing customizations, 200
    what can be customized, 201
  hiding, 52
  overview, 10
  Power Pivot Ribbon interface, activating, 783–784
  screen tips, 12
  tabs
    contextual, 12
    creating, 202
    Developer tab, displaying, 918–919, 985
    overview, 10–12
    rearranging, 203
  Ribbon Display Options control, 6
  right anti joins, 897
  RIGHT function
    converting dates to Julian format, 282–284
    converting text to sentence case, 256–257
    extracting parts of text string, 258–259, 868
    splitting text, 590
  right outer joins, 896
  right text alignment, 124
  right-clicking. See also shortcut menus
    Mini toolbar, 17
  ROA (return on assets), calculating, 337
  ROE (return on equity), calculating, 337–338
  ROUND function
    and decimal precision problems, 432
    rounding to significant digits, 248–250
    rounding to specified number of digits, 247
  ROUNDDOWN function, 292–293
  rounding
    numbers, 247
    to significant digits, 248–250
Index

rounding (continued)
  to the nearest penny, 247–248
  using formulas, 247
time values, 292–293
ROUNDUP function
  calculating calendar quarters, 286
  rounding time values, 292–293
Row Differences option, Go To Special dialog box, 78
ROW function
  displaying alternate-row shading, 140
  generating array of consecutive integers, 415–416
Row Height dialog box, 6
rows
  banded, 102, 103, 114
data body, 103
deleting, 67
duplicate
  identifying, 589
  removing, 587–588
header row, 103
headers, printing, 185
height, changing, 67, 68–69
hiding, 69
highlighting based on a value, 139–140
inserting, 66–67, 105
orientation, switching, 456–457
randomizing, 601
row numbers, 5, 6
selecting, 73
titles, printing, 183–185
total row, 102, 103–104
unhiding, 69
rows argument, OFFSET function, 369
rules, formula-based, 137–138
running totals, calculating, 244

S
sampling tool, Analysis ToolPak, 766
Save As command, 158, 1002
Save command, 158
saving
  Power Query queries, 841
  workbooks, 27–28, 157–159
    as add-in files, 1030, 1035
    AutoRecover, 159–160
    BeforeSave event, 1000, 1002
    containing macros, 920–921
    containing volatile functions, 54
    as CSV file, 159
    as template, 171
    using VBA, 1020
worksheets
  in PDF format, 194, 778
  in XPS format, 194, 778
scaling printed output, 185
scatter grams, 476
scatter plots, 476
Scenario Manager
  adding scenarios, 726–728
  defining scenarios, 725–728
  displaying scenarios, 728–729
  generating summary reports, 730–731
  merging scenarios, 729–730
  modifying scenarios, 729
Scenario Values dialog box, 727–728
Scientific number format, 50
screen updating, disabling, 1023
screenshots, inserting, 564
ScreenTips, 196
Scroll Lock key, 8
ScrollBar ActiveX control, 994
ScrollBars property, TextBox control, 995, 996
scrolling sheet tabs, 54–55
Search box, 15
Search control, 5, 6
SECOND function, 290–291
second(s)
  adding to a time, 294
  decimal seconds, converting, 294
  returning, 290–291
security
  macro security, 919–920
  Protected View, 156
Select Case construct, 943
Select Locked Cells option, Protect Sheet dialog box, 772
Select Unlockeds Cells option, Protect Sheet dialog box, 772
selected cell indicator, 5, 6
Selection dialog box, 95–97
SelectionChange worksheet event, 1003, 1005–1006
semantic errors, 423
sentence case, converting text to, 256–257
serial numbers
  dates, 269–270
times, 271–272
SERIES formula, editing, 512–513
series_name argument, SERIES function, 513

1066
Settings tab, Data Validation dialog box, 2, 3–4, 7, 9
shading
  checkerboard shading, creating, 140
displaying alternate-row shading, 140
formatting worksheets, 127–128
  groups of rows, 141
shapes
  formatting, 552–554
  hiding, 552
  infographic widgets, creating, 556–557
  inserting, 550–551
  layering, 556
  linked pictures, creating, 558–560
  peekaboo tabs, 554–555
  preventing from printing, 191–192
  selecting, 552
Shapes gallery, 550–551
sheet tab scroll buttons, 5, 7
sheet tabs, 5, 7
  color, changing, 57
  renaming, 56
  scrolling, 54–55
SheetActivate workbook event, 1000, 1001
SheetBeforeDoubleClick workbook event, 1000
SheetBeforeRightClick workbook event, 1000
SheetChange workbook event, 1000
SheetDeactivate workbook event, 1000
SheetSelectionChange workbook event, 1000
Shift+Tab key combination, 20
shortcut keys
  assigning macros to, 933–934
  copying cells/ranges, 83
  formatting fonts, 122
  for number formatting, 538–539
  Quick Access toolbar commands, 200
  for VBA macros, 925
shortcut menus, 16–17
  copying cells/ranges, 83, 84
  BeforeRightClick event, 1006
Show Formulas, 433
Show Iteration Results option, Solver Options dialog box, 743
Shrink to Fit, 125
shrinking text, 125
Signature Setup dialog box, 780
simple buttons, 13
Single data type, 1024
single-cell array formulas, 401–402
  counting characters in a range, 416–417
  counting text cells in a range, 418–419
  eliminating intermediate formulas, 419–421
  replacing range references with array constants, 421–422
  summing three smallest values in a range, 417–418
single-cell goal seeking, 734–737
single-factor analysis of variance, 757, 758
d sizes argument, SERIES function, 513
Skip Blanks option, Paste Special dialog box, 92
slicers
  filtering PivotTables, 698–700
  filtering tables, 110–112
SLN function, 351–353
SMALL function, 373–374
  summing smallest values in range, 417–418
SmallChange property
  ScrollBar control, 994
  SpinButton control, 995
SmartArt, 561–562
  preventing from printing, 191–192
SmartArt Tools
  Design
    Create Graphic, 562
    Layouts, 562
    SmartArt Styles, 562
  Format, 562
smoothing data
  exponential smoothing, 369–371, 759–760
  smoothing constants, 737–738
  using moving averages, 367–369, 761–763
Solver
  examples
    allocating resources, 750–751
    maximizing profits, 738–743
    minimizing shipping costs, 746–750
    optimizing investment portfolio, 751–753
    solving linear equations, 745–746
  installing, 738
  options, 743–744
  overview, 737
  problems appropriate for, 737
  starting, 739
  uses, 737
Solver Options dialog box, 743–744
Solver Parameters dialog box, 739–741
Solver Results dialog box, 741–742
Sort option, Protect Sheet dialog box, 772
sorting
  table data, 105–108
  tables, 106–108
source workbooks. See also linking workbooks
  changing link source, 643
  defined, 637
determining for a particular workbook, 645
Edit Links dialog box listing of, 642
links to nonexistent documents, 640
links to unsaved documents, 640
modifying, 644–645
moving, 644
renaming, 644
Save As command issue, 644
updating linked formulas, 643
updating links when source
  workbook is unavailable, 641
spacebar, effect of pressing in cells, 425–426
spaces
  extra spaces in formulas, 426
  identifying values containing, 426
  removing from text, 257–258, 598–599
Sparklines
  auto-updating, 535
  changing axis scaling, 530–531
  changing colors, 529
  changing line width, 529
  changing type, 529
  creating, 525–527
displaying for dynamic range, 535–536
faking reference lines, 531–533
handling hidden or missing data, 528
highlighting data points, 529–530
sizing cells, 528
specifying data axis, 533–534
Special number format, 50
spell-checking, 440, 606–607
Spelling dialog box, 440, 607
spin buttons, 14
SpinButton ActiveX control, 995
Split again command, 62
split button controls, 13
split buttons, 13
Split command, 62
splitting text, 589–595
  Flash Fill command, 592–595
  Text to Columns command, 591–592
splitting worksheets into panes, 62
spreadsheets
  file formats, 580
  reports as data models, 571–572
SQL Server, loading data into Power Pivot data model, 793–797
square root of array element, calculating, 413
standard deviation error bars, 517
standard error error bars, 517
Start Num argument, FIND function, 261
statistical analysis
  bucketing data into percentiles, 377–379
  creating a frequency distribution, 383–384
descriptive statistics, 371–377
calculating mean, median, mode, 375–377
getting largest/smallest value, 372–373
getting Nth largest/smallest value, 373–375
overview, 371
identifying outliers, 379–382
moving averages, 367–371
weighted averages, 365–367
statistical outliers, identifying, 379–382
statistics
  analysis of variance, 757–758
correlation, 758–759
descriptive, 759, 760
F-tests, 760
status bar, 5, 7
  hiding, 52
stock charts, 479, 481
straight-line depreciation, calculating, 351–352
StrConv function, 961–962
strike-through, applying, 122
String data type, 1025
Style property, ComboBox control, 992
Sub procedures, 921–922
SUBSTITUTE function
  counting characters in text string, 263–264
  replacing text in cells, 608
  substituting text strings, 262–263
substituting text, 262–263
SUM function, 623
calculating percent distribution, 243–244
counting text cells in a range, 417–418
creating array constants, 403
running total, calculating, 244
summing all values meeting condition, 303–306
summing smallest values in range, 417–418
SUMIF function, 303–310
SUMPRODUCT function, 365–367
sunburst charts, 485–486
surface charts, 479, 480
SVG (Scalable Vector Graphics) icons, inserting, 551–552
SYLK (Symbolic Link) files, 581, 611
symbols, in worksheet outlines, 635–636
syntax errors, 423, 424
   AutoCorrect and, 425
   mismatched parentheses, 424
T
test tool, Analysis ToolPak, 766–767
Tab key, cycling through dialog boxes, 20
   tab list, 5, 7
   tabbed dialog boxes, 20
Table Import Wizard
   loading data
      from external Excel files, 798–800
      from relational databases, 798
      from SQL Server, 793–797
      from text files, 798–800
Table Styles command, 113–114
Table Tools Design
   Table Style Options, 114
   Table Styles, 113–114
   Tools
      Insert Slicer, 110–111
tables
   adding data, 105
   components, 102–104
   creating, 104–105
   formulas within, 225–229
   linking to Power Pivot, 785–792
   overview, 102
   referencing data, 228–229
   resizing, 104
   sorting data, 105–108
   style, changing, 112–115
   summarizing data, 225–226
tabs
   color, changing, 57
   contextual, 12
   creating, 202
   in dialog boxes, 20, 21
   rearranging, 203
task panes, 20–22
   closing, 21
   re-docking, 21
   using the keyboard within, 21
template templates, creating, 522
   chart, 170–172
   custom, 168–170
   default, 168–170
   modifying, 168
   viewing, 165–166
text
   adding to cells, 608–609
   alignment, changing, 122–127
   case, changing, 256–256, 595–596, 865
   cleaning, 265, 866–868
   converting formulas to, 238
   counting specific characters, 263–264
   displaying at angle, 127
   as data type, 30
   editing in comments, 101
   extracting characters, 258–259, 868–870
   finding second instance of a character, 261
   finding specific characters, 259–261, 865–866
   formatting numbers in, 266–268
   free-floating, adding to charts, 498
   joining strings, 254–256
   line breaks, adding, 264–265
   matching in a list, 601–602
   numbers identified as, 254
   padding with zeros, 266
   removing from cells, 607–608
   removing spaces, 257–258, 598–599
   replacing, 439
      in cells, 607–608
   shrinking, 125
   splitting, 589–595
   substituting, 262–263
   trimming, 866–868
Unicode characters, 546–550
   wrapping, 125
text boxes, creating, 253
text files
   exporting data to Power Query, 853–854
   exporting to, 610–611
   formats, 581
      loading data into Power Pivot data model, 800–801
TEXT function
   formatting numbers in text strings, 266–268
   returning fiscal months, 288
Text Import Wizard, 581, 582, 583–587
Text number format, 50
Text to Columns command, 591–592
TextAlign property, TextBox control, 996
TextBox ActiveX control, 995–996
TEXTJOIN function
   joining columns, 600
   joining text strings, 255–256
ThisWorkbook module, 998
tick marks, 505
TIME function, 294
Time number format, 50
time value of money (TVM), 354–356
time(s)
   current, returning, 275–276
   custom number formatting, 545–546
   elapsed, calculating, 291–292
   entering, 272–273
   formatting, 273
   hour, returning, 290–291
   minute, returning, 290–291
   rounding time values, 292–293
   second, returning, 290–291
time-based category axis, 506–507
time-stamping worksheets, 44
timelines, filtering PivotTables, 700–701
title bar, 5, 7
title case, converting text to, 256, 595–596
titles
   chart titles, 497–498
   column titles, 183–185
   for dashboards, 576
   row titles, 183–185
TODAY function, 275–276
toggle buttons, 13
ToggleButton ActiveX control, 996
Tools
   References, 952
top text alignment, 125
Top/Bottom Rules, 137
total row, 102, 103–104
touch-related commands, 8
Touch/Mouse Mode command, 8
Trace Error command, 427
tracing
   cell relationships, 433–435
   error values, 435
   formula error values, 427
trailing minus signs, fixing, 609
Transform tab (Power Query)
   Capitalize Each Word, 865
   Clean, 867–868
   Data Type, 880–881
   Extract, 868–869
Group By, 885–886
Pivot Column, 875–876
Trim, 867
TRANSPOSE function
   inserting horizontal array into vertical range, 408
   transposing arrays, 414–415
Transpose option, Paste Special dialog box, 92–93
treemap charts, 486–487
trendlines, adding, 517–518
TRIM function
   identifying values containing spaces, 426
   removing spaces from text, 257–258, 596–597
trimming text, 866–868
Trust Center, 156, 157, 168
Tufte, Edward, 525
TVM (time value of money), 354–356
two-dimensional arrays, 405–406
two-factor analysis of variance, 758
two-sample tests
   for means, 766, 767
   for variance, 760, 766
TXT files, 581
   exporting to, 610–611
type argument, PV function, 355

U
UI customizations
   importing/exporting, 200
   Quick Access toolbar, 195–200
   Ribbon, 201–204
underline, applying, 122
Undo command, 17, 18
Unhide dialog box, 58–59
unhiding
   columns, 69
   rows, 69
   worksheets, 58–59
Unicode characters, 546–550
unlocking cells, 770–772
Unmerge Cells option, Merge & Center control, 126
Unpivot Columns command, 874
Unpivot Other Columns command, 874–875
unpivoting columns, 873–875
Unprotect Sheet command, 770
UPPER function, 256, 595
uppercase, converting text to, 256, 595
URLs, extracting filenames, 601
Use AutoFilter option, Protect Sheet dialog box, 772
Use Automatic Scaling option, Solver Options dialog box, 743
Use PivotTable & PivotChart option, Protect Sheet dialog box, 772
user interface, customizing
  Quick Access toolbar, 195–200
  Ribbon, 201–204
  sharing customizations, 200
user-defined data type, 1025
user-level permissions, assigning to worksheets, 773–774
UserForms
  accelerators, keys, adding, 980
  ActiveX controls
    adding, 968
    changing properties of, 969–970
    tab order, 980–981
  add-ins example, 1031–1035
  alternatives, 962–966
  closing, 972
  creating, 966–970, 971–972, 974–976
  displaying, 970, 978
  event handling, 970, 973–974, 976–977
  inserting in VBE, 967
  reasons for creating, 961–962
  testing, 972–973, 978–979

V
Validation option, Paste Special dialog box, 91
value axes
  in bubble charts, 477
  in combination charts, 518
defined, 451
  modifying, 501–505
  in stock charts, 477
#VALUE! errors, 230, 430
values
  applying a percent increase or decrease to, 244–245
  calculating percent variance with negative values, 242
  classifying, 598–599
  converting, 597–598
  converting formulas to, 238
  counting in a range, 250–251
  entering into worksheets, 31–34
  error values, 230
  graphical conditional format, 131–136
  hard-coding, 236–237
  number formatting, 44–50
  numeric, 29–30
  summing, 26
  weighted averages, 365–367
values argument, SERIES function, 513
variable-declining balance (VDB) appreciation, 351–354
variables, 941
  declaring data types, 1024–1026
  variances
    analysis of variance tests, 3–4
    covariance tool, 759
    F-tests, 760
    percent variance, 241–242
    T-tests, 766–767
    two-sample tests for, 760, 766
    Z-tests, 767
Variant data type, 1025
VBA
  chart-related tasks, 1021–1022
  comments, 936
  data types, 1024–1025
  Excel object model, 937
  functions. See functions
  Help system, 1011
  inserting modules, 936
  macros. See macros
  objects
    Application, 937, 939
    collections, 937–938
    Excel object model, 937
    methods, 939–940
    properties, 938–939
    qualified object references, 1012
    Range, 940–941
    simplifying references, 1024
    programming constructs, 941–945
    protecting VBA Projects, 777–778
    range-related tasks, 1011–1012
      copying ranges, 1012–1014
      counting selected cells, 1019–1020
      determining type of selection, 1018–1019
      looping through ranges, 1015–1016
      moving ranges, 1015
      prompting for cell values, 1016–1017
      selecting rows/columns, 1014
      selecting to end of row/column, 1014
    variables, 941
    workbook-related tasks, 1020
VBE (Visual Basic Editor), 989–990
  protecting VBA projects, 777–778
Index

VDB function, 352–354
vector-based images, 563
vertical alignment options, 125
vertical axes. See value axes
vertical data, converting to horizontal, 603–605
vertical scrollbar, 5, 7
View Side by Side feature, 61–62
View tab, 10
  Properties Window, 969
  Show
    Gridlines, 129
  Toolbox, 968
Window
  Freeze Panes, 62–64
  Reset Window Position, 62
  Split, 62
  Synchronous Scrolling, 62
  View Side by Side, 62
Visible Cells Only option, Go To Special dialog box, 79
visible digital signatures, signing workbooks, 780
visualizations. See graphics
VLOOKUP function
  calculating EBIT, 335–336
  calculating EBITA, 335–336
  defined, 316
  looking up exact values, 316–318
  looking up value using closest match, 323–324
#N/A errors, 196
volatile functions, saving workbooks with, 54

W
Watch Window, 65
waterfall charts, 483–484
watermarks, inserting, 186–187
week, number in year, returning, 281
WEEKDAY function, 280, 281, 623
week(s)
  last of month, calculating, 290
  Nth weekday of month, calculating, 289
  number from given date, extracting, 280, 281
weekend days, identifying, 139
WEEKNUM function, 280, 281
weighted averages, 365–367
what-if analysis
data tables
  limitations, 725
  one-input data tables, 718–721
  overview, 717–718
two-input data tables, 721–724
example, 715–716
manual approach, 717
Scenario Manager, 725
  adding scenarios, 726–728
  defining scenarios, 725–728
  displaying scenarios, 728–729
  generating summary reports, 730–731
  merging scenarios, 729–730
  modifying scenarios, 729
width argument, OFFSET function, 369
window controls, 5, 7
WindowActivate workbook event, 1000
WindowDeactivate workbook event, 1000
windows, 51–52
  closing, 54
  Excel window, 121–123
  maximizing, 52
  minimizing, 52
  moving, 52
  resizing, 52
  restoring, 52
  states, 52
  switching among, 53
With-End With construct, 943
WordArt, 562–563
WordWrap property, TextBox control, 996
workbook events, 997, 999–1003
  BeforeClose, 1002–1003
  BeforeSave, 1002
  NewSheet, 1002
  Open, 1000–1001
  WorkbookActivate, 1001
  Workbook_BeforeClose procedure, 1002
  Workbook_BeforeSave procedure, 1002
  Workbook_NewSheet procedure, 1002
  Workbook_Open procedure, 1000–1001
workbooks
  activating sheets, 1001
  adding worksheets, 55, 1002
  closing, 164
    BeforeClose event, 1000, 1002
    using VBA, 1020
  Workbook_BeforeClose procedure, 1002–1003
  converting to add-ins, 1030–1031
  creating
    using Blank Workbook command, 22, 153, 154
    introductory example, 22–28
    keyboard shortcut for, 154
from Start screen, 153–154
from a template, 166–168
exporting data to Power Query, 852–853
file extension, 4
finalizing, 778
inspecting, 779–780
linking, 637–646
  changing link source, 643
  changing startup prompt, 642–643
  creating external reference formulas, 638–640
  creating links to unsaved workbooks, 640–641
  intermediary links issue, 646
  modifying source workbook, 644–645
  moving source workbook, 644
  opening workbook with links, 641–642
overview, 637–638
phantom links, 432
renaming source workbook, 644
Save As command issue, 644
severing links, 643
updating links, 643
marking as final, 778
opening, 154–157
  automatically, 157
Open event, 1000–1001
requiring password, 774–775
with external reference formulas, 641–642
Workbook_Open procedure, 1000–1001
overview, 4–5, 4–7
protecting, 59, 769, 774–777
  adding digital signatures, 780
saving, 27–28, 157–159
  as add-in files, 1030, 1035
AutoRecover, 159–160
BeforeSave event, 1000, 1002
containing volatile functions, 54
  as CSV file, 159
  as template, 171
  using VBA, 1020
workbooks containing macros, 920–921

WORKDAY.INTL function, 279–280
worksheet events, 997, 1003–1006
  BeforeRightClick, 1006
Change, 1003–1005
SelectionChange, 1005–1006
worksheet outlines
  adding data, 635
  adjusting symbols, 635–636
  creating automatically, 632
creating manually, 632–634
displaying levels, 634–635
hiding symbols, 636
overview, 627–631
vs. PivotTables, 630–631
preparing data for, 631–632
removing, 635
Worksheet_BeforeRightClick procedure, 1006
Worksheet_Change procedure, 1003–1005
Worksheet_SelectionChange procedure, 1005–1006
worksheets
  activating, 54–55
  adding to workbooks, 55
  comparing, 61–62
consolidating, 646–645
  example, 650–653
  refreshing consolidation, 653–654
  sources, 654
  using external reference formulas, 647–648
  using the Consolidate dialog box, 649–650
  using the Paste Special dialog box, 648–649
copying, 57–58
data entry
  AutoComplete, 40–41
  AutoCorrect, 41–42
  AutoFill, 39–40
data forms, 42–44
dates, 33–34
  Enter mode, 33
  numbers, 38–39, 42
  numeric values, 31–32
text, 32–33
times, 34
date-stamping, 44
deleting, 55–56
filling gaps, 606–607
formatting, 117–118
  borders and lines, 128–130
  colors and shading, 127–128
  conditional formatting, 131–142
  document themes, 147–151
  fonts, 120–122
  named styles, 143–146
  text alignment, 122–127
  with the Format Cells dialog box, 119–120
  with the Home tab, 118
  with the Mini toolbar, 118–119
hiding, 58
moving, 57–58
worksheets (continued)
   naming, 56–57
   navigating cells, 179–182
   number formatting, 44–50
      automatic, 46
      custom formats, 50
      Format Cells dialog box, 48–50
   Ribbon controls, 46
   shortcut keys, 46–47
overview, 5
printing, 26–27
protecting, 59, 769, 770–774
   saving
      in PDF format, 194, 778
      in XPS format, 194, 778
   tab color, changing, 57
   time-stamping, 44
   unhiding, 58–59
views, 59
   comparing worksheets, 61–62
   creating, 60–61
   freezing panes, 62–64
   monitoring cells with Watch Window, 65
   splitting worksheets into panes, 62
   using multiple views, 60–61
\zooming, 59–60
   with the mouse, 10
   Zoom control, 7
Wrap Text, 125

X
   XIRR function, 359–360
   XLA files, 580
   .xlam file extension, 1027
   XLM files, 580
   XLS files, 580
   .xlsm file extension, 922
   .xlsx file extension, 4
   XLStart folder, workbooks stored in, 157
   XLT files, 580
   XML files, 582
   XML Paper Specification Document (XPS) files, 611
   saving worksheets as, 194, 778
   xVelocity analytics engine, 783
   XY charts, 476

Y
   y time unit code, DATEDIF function, 276
   yd time unit code, DATEDIF function, 276
   YEAR function, 280–281
   year(s)
      between dates, calculating, 282
      extracting year from given date, 280–281
      fiscal quarters, calculating, 287–288
      percent completed/remaining, calculating, 284
      returning, 280
   YEARFRAC function, 284
   yr time unit code, DATEDIF function, 276

Z
   Z-test tool, Analysis ToolPak, 767
   zeros
      divide-by-zero errors, 245–246
      hiding, 543–544
      padding numbers with, 266
      suppressing, 543–544
   Zoom control, 5, 7
   zooming worksheets
      with mouse, 10
   Zoom control, 7